

Table S1. qPCR performance of target genes and internal controls (*GAPDH*, *EIF3K* and *UXT*)

Gene	Median Ct ¹	Median Δ Ct ²	Slope	(R ²) ³	Efficiency ⁴
<i>ACACA</i>	27.35	3.50	-3.32	0.997	1.99
<i>ACSL1</i>	28.83	4.98	-3.37	0.997	1.97
<i>ACSS2</i>	22.75	-1.10	-3.1	0.937	2.00
<i>DGAT1</i>	23.09	-0.77	-3.51	0.996	1.92
<i>DGAT2</i>	21.78	-2.07	-3.47	0.995	1.94
<i>FABP3</i>	29.05	5.20	-3.38	0.994	1.97
<i>FABP4</i>	29.22	5.36	-3.29	0.961	2.00
<i>FADS2</i>	27.00	3.14	-3.51	0.999	1.92
<i>FASN</i>	28.91	5.06	-3.76	0.998	1.84
<i>INSIG1</i>	30.14	6.28	-3.32	0.987	1.99
<i>LPIN1</i>	28.68	4.82	-3.53	0.995	1.91
<i>LPL</i>	27.09	3.23	-3.38	0.995	1.97
<i>PLIN2 (ADFP)</i>	27.24	3.39	-3.56	0.995	1.90
<i>PPARG</i>	22.55	-1.31	-3.43	0.996	1.95
<i>SCAP</i>	29.46	5.60	-3.54	0.998	1.91
<i>SCD</i>	28.27	4.41	-3.62	0.997	1.88
<i>SLC27A6</i>	25.12	1.26	-3.42	0.996	1.96
<i>SREBF1</i>	22.96	-0.89	-3.32	0.996	1.99
<i>THRSP</i>	20.06	-3.80	-3.44	0.995	1.95
<i>VLDLR</i>	22.36	-1.50	-3.38	0.995	1.97
<i>GAPDH</i>	21.09	-	-3.63	0.998	1.88
<i>EIF3K</i>	24.12	-	-3.4	0.994	1.96
<i>UXT</i>	26.36	-	-3.4	0.995	1.96

¹The median is calculated considering all samples.

²The median of Δ Ct is calculated as [Ct gene – geometric mean of Ct internal controls] for each sample.

³R² represents the coefficient of determination of the standard curve.

⁴Efficiency was calculated as $[10^{(-1 / \text{Slope})}]$.

Table S2. Relative expression of genes involved in lipid metabolism in milk somatic cells from cows fed control (no fat supplementation) on days 42 and 63 using the relative abundance of day 21 as a reference condition

Gene	Day	Relative abundance	Standard error	P-value	Regulation
<i>ACACA</i>	42	0.329	0.020 - 4.69	0.274	
	63	2.485	0.396 - 11.4	0.101	
<i>FADS2</i>	42	0.167	0.072 - 0.389	<0.001	DOWN
	63	3.916	0.180 - 137.8	0.189	
<i>FASN</i>	42	1.392	0.058 - 44.7	0.772	
	63	11.268	0.888 - 155.4	<0.001	UP
<i>SCD</i>	42	0.171	0.024 - 1.96	<0.001	DOWN
	63	2.152	0.199 - 24.5	0.252	
<i>ADFP (PLIN2)</i>	42	0.716	0.141 - 5.91	0.642	
	63	2.251	0.307 - 10.7	0.117	
<i>INSIG1</i>	42	2.361	0.421 - 7.38	0.084	
	63	15.834	2.18 - 546.3	<0.001	UP
<i>SCAP</i>	42	0.046	0.016 - 0.109	<0.001	DOWN
	63	0.469	0.114 - 2.67	0.128	
<i>SREBF1</i>	42	1.815	0.152 - 12.8	0.363	
	63	10.979	1.79 - 108.3	<0.001	UP
<i>THRSP</i>	42	0.541	0.219 - 1.32	0.054	
	63	8.051	0.417 - 1.00	0.158	
<i>PPARG</i>	42	0.17	0.026 - 0.902	<0.001	DOWN
	63	2.744	1.09 - 7.92	<0.001	UP
<i>DGAT1</i>	42	0.562	0.037 - 12.3	0.583	
	63	9.123	1.07 - 62.9	<0.001	UP
<i>DGAT2</i>	42	1.917	0.266 - 8.45	0.247	
	63	8.284	0.631 - 75.0	<0.001	UP
<i>LPIN1</i>	42	2.313	0.098 - 54.7	0.432	
	63	19.127	2.72 - 117.0	<0.001	UP
<i>LPL</i>	42	5.565	0.924 - 33.1	<0.001	UP
	63	5.048	0.789 - 17.6	<0.001	UP
<i>FATP</i>	42	1.946	0.213 - 14.5	0.340	
	63	7.856	1.32 - 40.5	<0.001	UP
<i>VLDLR</i>	42	2.194	0.779 - 7.78	<0.001	DOWN
	63	4.497	1.26 - 14.8	<0.001	UP
<i>ACSL1</i>	42	9.677	2.61 - 30.2	<0.001	UP
	63	2.914	1.03 - 14.2	<0.001	UP
<i>ACSS2</i>	42	8.539	3.36 - 28.8	<0.001	UP
	63	2.46	0.620 - 9.34	<0.001	DOWN
<i>FABP3</i>	42	1.512	0.605 - 4.43	0.185	
	63	1.057	0.517 - 2.06	0.766	
<i>FABP4</i>	42	0.552	0.085 - 4.59	0.358	
	63	1.487	0.276 - 4.81	0.431	

Table S3. Relative abundance of genes involved in lipid metabolism in milk somatic cells from cows fed with olive oil (OO) on days 42 and 63 using the relative abundance of day 21 as a reference condition

Gene	Day	Abundance	Standard Error	P-Value	Regulation
<i>ACACA</i>	42	19.803	0.478 - 4.912.875	0.037	UP
	63	2.286	0.356 - 18.930	0.239	
<i>FADS2</i>	42	1.496	0.194 - 16.142	0.544	
	63	0.824	0.060 - 38.501	0.843	
<i>FASN</i>	42	1.994	0.168 - 74.288	0.445	DOWN
	63	0.041	0.002 - 0.515	0.001	
<i>SCD</i>	42	0.881	0.367 - 2.172	0.652	
	63	2.337	0.369 - 21.641	0.204	
<i>ADFP (PLIN2)</i>	42	2.326	1.296 - 4.679	0.001	UP
	63	0.579	0.168 - 1.900	0.16	
<i>INSIG1</i>	42	1.148	0.072 - 17.507	0.88	
	63	0.959	0.039 - 25.668	0.962	
<i>SCAP</i>	42	1.13	0.164 - 6.585	0.844	
	63	0.322	0.028 - 2.949	0.155	
<i>SREBF1</i>	42	0.593	0.098 - 9.093	0.489	DOWN
	63	0.136	0.025 - 0.992	0.003	
<i>THRSP</i>	42	0.915	0.245 - 3.531	0.875	DOWN
	63	0.186	0.043 - 1.169	0.015	
<i>PPARG</i>	42	1.409	0.149 - 8.976	0.615	
	63	0.35	0.048 - 2.145	0.098	
<i>DGAT1</i>	42	7.379	2.437 - 23.592	<0.001	UP
	63	0.168	0.022 - 1.072	0.01	DOWN
<i>DGAT2</i>	42	1.455	0.306 - 14.246	0.54	DOWN
	63	0.147	0.017 - 0.806	0.003	
<i>LPIN1</i>	42	2.442	0.469 - 14.763	0.117	
	63	0.537	0.122 - 2.350	0.233	
<i>LPL</i>	42	2.429	0.883 - 7.908	0.011	UP
	63	0.458	0.168 - 1.516	0.048	DOWN
<i>FATP</i>	42	2.455	0.569 - 9.738	0.068	
	63	1.187	0.559 - 3.334	0.569	
<i>VLDLR</i>	42	0.246	0.063 - 1.089	0.008	DOWN
	63	0.528	0.167 - 1.514	0.09	
<i>ACSL1</i>	42	28.495	4.217 - 180.201	<0.001	UP
	63	0.705	0.140 - 2.961	0.54	
<i>ACSS2</i>	42	2.636	0.734 - 16.940	0.1	DOWN
	63	0.268	0.044 - 2.152	0.036	
<i>FABP3</i>	42	1.512	0.260 - 5.239	0.519	
	63	0.489	0.089 - 1.677	0.197	
<i>FABP4</i>	42	1.181	0.390 - 3.941	0.672	
	63	2.206	0.293 - 13.372	0.175	

Table S4. Relative abundance of genes involved in lipid metabolism in milk somatic cells from cows fed with hydrogenated vegetable oil (HVO) on days 42 and 63 using the relative abundance of day 21 as a reference condition

Gene	Day	Abundance	Standard error	P- Value	Regulation
<i>ACACA</i>	42	2.955	0.361 - 26.228	0.135	
	63	6.719	1.797 - 47.276	0.023	UP
<i>FADS2</i>	42	0.256	0.043 - 1.896	0.044	DOWN
	63	0.172	0.015 - 3.036	0.071	
<i>FASN</i>	42	3.652	0.233 - 58.763	0.118	
	63	43.966	2.382 - 1.384.567	<0.001	UP
<i>SCD</i>	42	0.67	0.320 - 1.853	0.253	
	63	3.091	0.569 - 14.437	0.062	
<i>ADFP (PLIN2)</i>	42	1.228	0.282 - 5.536	0.607	
	63	4.811	1.849 - 12.244	<0.001	UP
<i>INSIG1</i>	42	1.103	0.196 - 3.505	0.83	
	63	0.935	0.159 - 2.972	0.876	
<i>SCAP</i>	42	0.305	0.057 - 2.118	0.055	
	63	1.473	0.129 - 17.374	0.569	
<i>SREBF1</i>	42	0.371	0.091 - 2.319	0.123	
	63	7.777	0.614 - 140.607	0.017	UP
<i>THRSP</i>	42	2.543	0.225 - 131.930	0.365	
	63	0.259	0.012 - 4.184	0.158	
<i>PPARG</i>	42	0.076	0.017 - 0.288	<0.001	DOWN
	63	1.206	0.167 - 7.902	0.755	
<i>DGAT1</i>	42	2.821	0.303 - 13.662	0.106	
	63	13.996	1.617 - 55.742	<0.001	UP
<i>DGAT2</i>	42	1.117	0.190 - 12.477	0.882	
	63	20.255	3.898 - 69.142	<0.001	UP
<i>LPIN1</i>	42	0.216	0.086 - 0.463	0.001	DOWN
	63	2.338	0.837 - 7.286	0.028	UP
<i>LPL</i>	42	1.118	0.519 - 2.527	0.718	
	63	3.974	1.917 - 12.158	<0.001	UP
<i>FATP</i>	42	3.259	1.358 - 7.567	0	UP
	63	3.183	1.029 - 14.975	0.018	UP
<i>VLDLR</i>	42	0.804	0.474 - 1.347	0.244	
	63	1.872	1.029 - 3.219	0.011	UP
<i>ACSL1</i>	42	11.963	1.774 - 223.026	0	UP
	63	5.809	0.947 - 108.280	0.023	UP
<i>ACSS2</i>	42	1.901	0.904 - 4.131	0.035	UP
	63	3.824	0.622 - 11.613	0.011	UP
<i>FABP3</i>	42	2.512	0.656 - 8.561	0.075	
	63	1.42	0.247 - 7.227	0.513	
<i>FABP4</i>	42	2.099	0.317 - 21.543	0.242	
	63	0.635	0.245 - 2.848	0.331	